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INTEL/BSTZ

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EXAMINER

NGUYEN, DILINH P

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RICHARD D. EMERY

Appeal 2010-003708
Application 10/608,718¹
Technology Center 2800

Before MAHSHID D. SAADAT, MARC S. HOFF, and THOMAS S.
HAHN *Administrative Patent Judges*.

HOFF, *Administrative Patent Judge*.

DECISION ON APPEAL²

¹ The real party in interest is Intel Corporation.

² The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the “MAIL DATE” (paper delivery mode) or the “NOTIFICATION DATE” (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

STATEMENT OF CASE

Appellant appeals under 35 U.S.C. § 134(a) from a Non-Final Rejection of claims 1, 3, 4, and 6-10.³ We have jurisdiction under 35 U.S.C. § 6(b).

We affirm.

Appellant's invention concerns microelectronic package fabrication. A microelectronic device that comprises a package and a die is fabricated such that the package exerts forces on the die to cause it to expand and contract with the package. The device is constructed such that the apparent coefficient of thermal expansion (CTE) of the die more closely matches the CTE of the package (Spec. ¶¶ 0010, 0016).

Claim 1 is exemplary of the claims on appeal:

1. A microelectronic device comprising:
a die, the die comprising a first side, a second side, and an edge;
a first plate, the first plate coupled with the die, the first plate exerting force on the die to modify the effective coefficient of thermal expansion of the die;
and
a package, the die being coupled with the package.

The Examiner relies upon the following prior art in rejecting the claims on appeal:

Horvath	US 4,415,025	Nov. 15, 1983
Lee	US 6,081,037	Jun. 27, 2000
Zhang	US 2002/0171144 A1	Nov. 21, 2002

³ Claims 2 and 11-30 have been cancelled. Claim 5 stands objected to as dependent on a rejected base claim, but would be allowable if rewritten in independent form.

Claims 1, 4, and 6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Lee.

Claims 1 and 6 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Horvath.⁴

Claims 3 and 7-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lee or Horvath in view of Zhang.

Throughout this decision, we make reference to the Appeal Brief (“App. Br.,” filed November 3, 2006) and the Examiner’s Answer (“Ans.,” mailed December 31, 2008) for their respective details.

ISSUES

With respect to the § 102 rejection of claims 1 and 6 over Horvath, Appellant argues that Horvath is directed to conducting heat away from a die, rather than exerting force on a die or the modification of the effective CTE of a die (App. Br. 10). Similarly, with respect to the § 102 rejection of claims 1, 4, and 6 over Lee, Appellant argues that Lee is concerned with heat conduction, and not with the exertion of force on a die to modify the effective CTE (App. Br. 10). In response, the Examiner finds that Horvath and Lee nonetheless teach all the structural limitations of the rejected claims (Ans. 5-6).

Appellants’ contentions present us with the following issues:

1. Does Horvath teach a first plate coupled with a die and exerting force on the die to modify the effective CTE of the die, as claim 1 requires?

⁴ In the Examiner’s Answer, the Examiner notes that he has withdrawn the rejection of claims 1 and 6 under § 102 as being anticipated by Turner (Ans. 10).

2. Does Lee teach a first plate coupled with a die and exerting force on the die to modify the effective CTE of the die, as claim 1 requires?

FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

Horvath

1. Horvath's thermal element 24 is positioned above and exerts a force (due to gravity) on semiconductor (die) 12 (Fig. 1).
2. Horvath teaches that the number of slots, and the length relative to the diameter, of thermal element 24 is dictated by the thickness of the disk 24 and the permissible force that can be exerted on semiconductor 12 (Fig. 2; col. 3, ll. 50-54).

Lee

3. Lee teaches a die 11 inserted in cavity 34 that is within chip mount 31 so that chip mount 31 is coupled with the die and exerts force on the die (Fig. 2; col. 3, ll. 6-15).
4. Lee further teaches that "[a]fter chip mount 31 cools down to room temperature, cavity 34 contracts and edges 35, 36, 37, and 38 compress sidewalls 15, 16, 17, and 18 respectively" (col. 3, ll. 24-29).

PRINCIPLES OF LAW

"A rejection for anticipation under section 102 requires that each and every limitation of the claimed invention be disclosed in a single prior art reference." *See In re Buszard*, 504 F.3d 1364, 1366 (Fed. Cir. 2007) (quoting *In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed. Cir. 1994)).

On the issue of obviousness, the Supreme Court has stated that “the obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007). Further, the Court stated “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 416. “One of the ways in which a patent’s subject matter can be proved obvious is by noting that there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent’s claims.” *Id.* at 419-420.

A patent applicant is free to recite features of an apparatus either structurally or functionally. *See In re Swinehart*, 439 F.2d 210, 212 (CCPA 1971) (“[T]here is nothing intrinsically wrong with [defining something by what it does rather than what it is] in drafting patent claims.’). Yet, choosing to define an element functionally, i.e., by what it does, carries with it a risk.” *In re Schreiber*, 128 F.3d 1473, 1478 (Fed. Cir. 1997). As stated in *Swinehart*:

[W]here the Patent Office has reason to believe that a functional limitation asserted to be critical for establishing novelty in the claimed subject matter may, in fact, be an inherent characteristic of the prior art, it possesses the authority to require the applicant to prove that the subject matter shown to be in the prior art does not possess the characteristic relied on.

Swinehart, 439 F.2d at 213.

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the

prior art in terms of structure rather than function. *See, e.g., In re Schreiber*, 128 F.3d at 1477-78.

ANALYSIS

§ 102 REJECTION OVER HORVATH

We select claim 1 as representative of this group of claims, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellant's arguments, summarized *supra*, are not persuasive to establish that the Examiner erred in rejecting representative claim 1 as being anticipated by Horvath. The Examiner finds, and we agree, that Horvath's thermal element 24 exerts a force (due to gravity) on semiconductor (die) 12 (Ans. 6; FF 1). Horvath teaches that the number of slots, and the length relative to the diameter, of thermal element 24 is dictated by the thickness of the disk 24 and the permissible force that can be exerted on semiconductor 12 (FF 2). We regard the limitation "to modify the effective coefficient of thermal expansion of the die" to be a functional characteristic that inheres in Horvath from the presence of structure corresponding to that claimed. Since we agree with the Examiner that Horvath teaches all the structural limitations of representative claim 1, the claim does not distinguish over Horvath. *See Schreiber, supra*.

Because Appellants have not shown that the Examiner erred in rejecting claims 1 and 6 as anticipated by Horvath, we sustain the Examiner's § 102 rejection of claims 1 and 6.

§ 102 REJECTION OVER LEE

We select claim 1 as representative of this group of claims, pursuant to our authority under 37 C.F.R. § 41.37(c)(1)(vii).

Appellant's arguments, summarized *supra*, are not persuasive to establish that the Examiner erred in rejecting representative claim 1 as being anticipated by Lee. The Examiner finds, and we agree, that Lee teaches a die 11 inserted in cavity 34 that is within chip mount 31 so that chip mount 31 is coupled with the die and exerts force on the die (FF 3). Lee further teaches that "[a]fter chip mount 31 cools down to room temperature, cavity 34 contracts and edges 35, 36, 37, and 38 compress sidewalls 15, 16, 17, and 18 respectively" (FF 4). We regard the limitation "to modify the effective coefficient of thermal expansion of the die" to be a functional characteristic that inheres in Lee from the presence of structure corresponding to that claimed. Since we agree with the Examiner that Lee teaches all the structural limitations of representative claim 1, the claim does not distinguish over Lee. *See Schreiber, supra*.

Because Appellants have not shown that the Examiner erred in rejecting claims 1 and 6 as anticipated by Horvath, we sustain the Examiner's § 102 rejection of claims 1 and 6.

§ 103 REJECTION OVER HORVATH OR LEE IN VIEW OF ZHANG

Appellants only argue that Zhang does not remedy the deficiencies asserted to exist in Horvath and Lee (App. Br. 13-14). Because we find *supra* that the Examiner did not err in finding parent claim 1 to be anticipated by Horvath and by Lee, we therefore find no error in the Examiner's § 103 rejection of claims 3 and 7-10 over Horvath or Lee in view of Zhang, for the same reasons.

CONCLUSIONS

1. Horvath teaches a first plate coupled with a die and exerting force on the die to modify the effective CTE of the die, as claim 1 requires.

2. Lee teaches a first plate coupled with a die and exerting force on the die to modify the effective CTE of the die, as claim 1 requires.

ORDER

The Examiner's rejection of claims 1, 3, 4, and 6-10 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a).

Appeal 2010-003708
Application 10/608,718

AFFIRMED

ELD

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